Thermomechanical treatment ....

to 1 150, 1 100, 1 050 and 1 000 °C. A number of test pieces were given conventional treatment (water-quenching) to obtain control specimens for comparison. All the test pieces (whether quench-hardened or subjected to TMO) were aged at 680 °C for 10 hours, after which they were given an additional treatment of 10 hours at 790 °C, followed by air-cooling so as to attain hardness corresponding to the indentation diameter $d_{отп}$ = = 3.5 - 3.7 mm. In addition to standard tensile tests at room temperature, tests at 650 °C were carried out under conditions of short and prolonged loading, the latter (i.e. creep) tests being conducted under an applied stress of 39 or 45 kg/mm^2. To study and compare the progress of diffusion processes in material subjected to TMO or given the conventional treatment, the rate of diffusion was measured by a radioactive-tracer technique, entailing cutting a taper section across the diffusion region.
A thin film of Fe^{59} was electrodeposited on the specimens studied, which were then given a 150-hours diffusion-annealing treatment at 800 °C in vacuum, after which both volume and grain-boundary

Thermomechanical treatment ....

diffusion coefficients were determined. Overall diffusion coefficients were also calculated with the aid of the absorption method. Phase-analysis was used to study the effect of hot plastic deformation on the process of carbide-formation during ageing. Electrolytic extraction of the carbide phase from various test pieces was carried out in a 5% solution of hydrochloric acid in methanol. The anode residues were also examined by X-ray diffraction measurements. Preliminary examination of the microstructure revealed that, irrespective of the rolling speed employed during TMO, full suppression of recrystallization had been achieved in small (13 mm diameter) test pieces only. None of the TMO procedures used on large (60 mm diameter) test pieces had ensured suppression of the recrystallization process. The results of standard tensile tests at 20 and 650 °C, carried out on small specimens, showed that TMO brought about a slight increase in UTS at 20 °C (from 108 - 114 kg/mm^2) but had no effect on the strength of steel at 650 °C. The variation in plasticity was somewhat different.

Thus, as the rolling speed during TMO increased, the elongation of steel at room temperature decreased below that of specimens heat-treated in the conventional manner and then increased to exceed this value. The same applied to reduction in area which, after TMO entailing deformation by rolling at 13.5 m/min, attained a value of 55.2%, i.e. 25% higher than the value attained after conventional treatment. The results of tensile tests at 650 °C also showed a slight increase in elongation of specimens subjected to TMO, although reduction in area of specimens rolled at 13.5 m/min was somewhat lower than that of the control test pieces. The results of accelerated creep tests conducted on small test pieces under a stress of 43 kg/mm^2 showed that irrespective of the conditions during TMO, the time-to-rupture of the steels studied increased after this treatment by 20-25%. The corresponding increase for specimens tested under a stress of 39 kg/mm^2 amounted to 600%. Metallographic examination of small specimens showed that recrystallization during TMO had been completely suppressed in each of the specimens examined. This was indicated by the absence of new small crystals which

Thermomechanical treatment ....

were usually formed in recrystallized material along the boundaries of the original grains. A common specific structural feature of all specimens subjected to TMO was distortion of grain boundaries which had assumed a characteristic serrated contour. A distinguishing feature of specimens rolled during TMO at a speed of 4.5 m/min was well-developed sub-structure. The formation of sub-structure was associated with the formation of blocks (several tens of microns in size) in the interior of the grains. The relatively large angular misalignment of these blocks was indicated by the ease with which the block boundaries could be revealed by etching. No such clearly defined sub-structure was observed in specimens rolled during TMO at higher speeds, although in a few isolated instances there was some evidence of block formation. The formation of the fine structure could be attributed to polygonization processes and subsequent decoration of the low-angle boundaries by the solute atoms and second-phase particles. Another specific feature of the structure produced by TMO is the fragmentation of grains, i.e. sub-division

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of grains into parts whose dimension are commeasurable with the size of the grains themselves. It would appear that fragmentation is mainly a result of intensive twinning taking place during hot plastic deformation. As stated already, none of the TMO procedures applied to large (60 mm diameter) test pieces ensured complete suppression of recrystallization, the content of which increased with depth so that an unrecrystallized structure was observed only in the very surface layers of the material. In this case TMO had practically no effect on the resistance-to-creep of the steels studied. The results of phase analysis showed that although the chromium-carbide content of specimens subjected to TMO had increased considerably, it was independent of the rolling speed employed in the course of this treatment. The vanadium-carbide content of the material was practically unaffected by TMO. Finally, the results of diffusion studies indicated that after TMO the coefficient of volume diffusion of iron in steel at 800 °C increased fourfold. Since, owing to a general increase in the diffusion mobility, difficulties were encountered in determining the grain-boundary diffusion

coefficient, the overall diffusion coefficients were measured by the absorption method. Comparison of the results obtained for test pieces with different structures showed that the overall diffusion coefficient for materials which had undergone TMO was more than twice as high as that for specimens given the conventional treatment. The general conclusion reached was that in addition to the previously established strengthening effect of grain-boundary distortion caused by TMO, the beneficial effect of this treatment on the high-temperature properties of steel was associated with an increase in the quantity of the strengthening phase and, possibly, with refinement of the mosaic structure and formation of slight texture. There are 4 figures and 2 tables.

SUBMITTED: October 11, 1961

Card 3/3

S/180/62/000/003/007/016
E111/E152

AUTHORS: Sokolkov, Ye.N., Lozinskiy, M.G., and Chupakova, N.P. (Moscow)

TITLE: Some peculiarities in the mechanism of plastic deformation of austenitic steels and alloys in high-temperature thermo-mechanical treatment

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Metallurgiya i toplivo, no.3, 1962, 71-77

TEXT: High-temperature thermo-mechanical treatment entails plastic deformation, carried out at temperatures above the recrystallization temperature. In the present work some specific features of the mechanism of this process are studied in the chromium-nickel-manganese steel and a Nimonic-type alloy. The treatment was carried out at 1000-1100 °C with rolling at speeds of 3-6 m/min to give 25-30% reductions; nucleation and growth of new grains being arrested by cooling in water. Resulting microstructures were compared with those produced by ordinary

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heat treatment. The authors conclude that in the course of the treatment studied a slip occurs accompanied by rectification of the crystal lattice in the zones of slip and in the adjacent regions. In addition, a diffusion displacement of parts of grain-boundaries also occurs. These segments, formed as a result of the emergence of slip planes onto grain boundaries, undergo diffusion displacement similar to grain-boundary migration in a stress field. Slip and displacement of grain boundary segments cause serrated distortion of grain boundaries specific to the treatment, the coarseness of the serrations increasing with intensification of the diffusion displacement. As a result of the diffusion redistribution of the crystal lattice defects produced in plastic deformation, substructure sometimes appears; its preferential appearance at the grain boundaries indicates that plastic deformation is most intense there.
There are 6 figures.

SUBMITTED: December 6, 1961

Card 2/2

35953
S/126/62/013/001/014/018
E195/E383

18.1100

AUTHORS: Lozinskiy, M.G., Sokolkov, Yc.N., Varli, K.V. and Skakov, Yu.A.

TITLE: The effect of high-temperature thermomechanical treatment on the fine crystal structure of austenitic steels and alloys

PERIODICAL: Fizika metallov i metallovedeniye, v.13, no. 1, 1962, 137 - 143

TEXT: In contrast to treatment which consists of plastic deformation of steel below the upper limit of the martensitic-transformation range (i.e. at 400 - 600 °C), followed by quenching and which, according to the present authors, should be referred to as "low-temperature thermomechanical treatment" (NTMO), the term "high-temperature thermomechanical treatment" (VTMO) is proposed for a similar treatment in which steel is deformed at a temperature above its recrystallization temperature before quenching. It has already been established that a substantial increase in the strength of steel can be brought about

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The effect of ....

by this treatment and it has been postulated that this effect is partly associated with changes in the fine crystal structure of the material, formation of stresses of the second type and texture. It was in order to check this postulate that the investigation described in the present paper was undertaken. Experiments were carried out on a Cr-Ni-Mn steel containing 0.56% C, 0.5% Si, 8.0% Mn, 12.2% Cr, 8.5% Ni, 1.5% V, 1.15% Mo, 0.3% Nb (alloy A) and on Nimonic type alloy containing 0.05% C, 0.5% Si, 0.5% Mn, 20.09% Cr, 0.6% Al and 2.4% Ti (alloy B). Test pieces (square rods measuring 11 x 11 x 60 mm) were heated in air in an electric furnace, hot-rolled, quenched and then aged, the various schedules employed being given in Table 1. In some cases, a higher rolling speed (5.7 m/min) or heavier reductions (36%) were used. At the same time, pilot test pieces were heat-treated in the conventional manner by quenching from temperatures given in column 4 of Table 1. The effect of each type of treatment was then studied by metallographic examination, measuring Vickers hardness and electrical resistivity at room temperature, determining the lattice parameters of the

The effect of ....

solid-solution matrix, block dimensions and the magnitude of microstresses, and by evaluation of the character of texture of the specimens. Some of the typical results are given in Table 2. Similar results were obtained for alloy E, which, however, requires supplementary study. The conclusions reached can be summarized as follows:

1) VTMO brings about substantial (in comparison with the conventional hardening treatment) changes in the shape of the grain boundaries and orientation of the grains, and markedly affects the condition of the solid-solution matrix.

2) VTMO promotes more complete dissolution of the second phase on heating and more complete precipitation of this phase during ageing than the conventional heat-treatment.

3) VTMO brings about a decrease in the dimensions of the mosaic blocks (down to 0.05 μ in the case of alloy A), this effect becoming less pronounced if higher temperatures or faster rolling speeds are employed.

4) Quite large (up to 1×10^{-3}) microstrains are set up in the alloy as a result of VTMO, ageing or quenching from relatively

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high temperatures.
5) Materials subjected to VTMO have a texture close to axial, the [111] direction being the preferred orientation parallel to the direction of rolling.
6) A maximum increase in strength is attained after VTMO followed by ageing. The beneficial effect of this treatment is associated with the precipitation of a large quantity of the hardening-phase particles, with more favourable distribution of this precipitate and indirectly with the reduced size of the mosaic blocks. There are 2 tables.

ASSOCIATION: Institut fiziki metallov AN SSSR (Institute of Physics of Metals of the AS USSR)

SUBMITTED: September 18, 1961

The effect of ....

Table 1: Schedules of VTMO and subsequent heat-treatment of test pieces which were hot-rolled during VTMO to 25% reduction at a rolling speed of 1.5 m/min and then quenched in water.

Material	No. of treatment schedule	Temperature, °C and holding time, hrs	Rolling temperature, °C	Ageing conditions, °C
Alloy A	I	1150 - 1 hr	1100	750 - 4 hrs
	II	1175 - 1 hr	1000	750 - 4 hrs
	III	1200 - 1 hr	1200	750 - 4 hrs
Alloy B	I	1080 - 8 hrs	1080	700 -16 hrs
	II	1080 - 8 hrs	1000	700 - 16 hrs

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E193/E383

Table 2: Properties of Alloy A after VTMO carried out according to schedule I (as given in Table 1)

Type of Treatment	Lattice parameter, kX	resistivity, $\mu\Omega$·cm	Block dimensions Δ, μ	Micro-deformation, $\varepsilon \cdot 10^4$	HV, kg/mm^2
Conventional hardening without ageing	3.595	62.7	≥ 0.2	0	220
Conventional hardening with ageing	3.592	61.2	$\frac{\geq 0.2}{\geq 0.2}$	$\frac{10}{8}$	290
VTMO (without ageing)	3.598	63.4	$\frac{0.06}{0.05}$	$\frac{4}{7}$	240
VTMO (with ageing)	3.590	59.4	$\frac{0.06}{0.05}$	$\frac{7}{10}$	330

* in the numerator - results obtained by the approximation method; in the denominator - results of harmonic analysis.

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L 9960-65 EWT(m)/T/EWP(k)/EWP(b) Pf-4 ASD(m)-3/ASD(f)-2 JD/HW/ML
ACCESSION NR: AT4046864 S/0000/64/000/000/0331/0335

AUTHOR: Sokolkov, Ye. N., Sadovskiy, V.D., Surkov, Yu. P., Chuprakova, N.P., Nichkova, M.M.

TITLE: Investigation of the hardening and structural stability of austenitic alloys after high-temperature thermomechanical treatment

SOURCE: AN SSSR. Nauchny*y sovet po probleme zharoprochny*y splavov. Issledovaniya staley i splavov (Studies on steels and alloys). Moscow, Izd-vo Nauka, 1964, 331-335

TOPIC TAGS: thermomechanical treatment, alloy hardening, alloy structure, alloy crystallization, austenite, alloy heat resistance, alloy hardness, plastic deformation, alloy steel, austenitic steel

ABSTRACT: Improvement of heat resistance by high-temperature thermomechanical treatment is based on the creation of a special structure in the material during hot plastic deformation and its fixation by cooling which prevents recrystallization. The present article investigates the features of hardening of chromium-nickel-manganese austenitic steel with admixtures of tungsten and titanium after high-temperature thermomechanical treatment and aging. The effect of temperature and plastic deformation rate

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ACCESSION NR: AT4046864

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were studied in relation to recrystallization in alloys rolled at a rate of 1.5 m/min at 950-1150C. Samplesfor rolling were 11.5x11.5X60 mm, and for upsetting were 50x50x70 mm. Special insulation was used during upsetting to prevent rapid cooling. All samples were cooled in water after plastic deformation. The effects of aging were studied by hardness measurements, while structural stability was measured by microstructural analysis. Hardness measurements showed that all alloys selected in the test showed a higher hardness than after the usual thermal treatment. The difference in hardness in comparison with the usual hardening procedures was 15-20 kg/mm^2 even after high temperature thermomechanical treatment at 800C for 32 hours. Similar results were obtained for other heating and aging temperatures. Impact toughness was also higher after high-temperature thermomechanical treatment (12-13 kg-m/cm^2 instead of 5-7). It is noted that aging for even 1000 hours leads to high stability of the investigated alloys, and that lowering of the rate of plastic deformation leads to redistribution of defects, avoiding "critical" fields where distorted grains appear. Microstructural analysis also showed that lowering of the deformation rate decreased the tendency toward recrystallization, and altered the grain boundary deviations from a dentate to a wave-like pattern. These results lead to new possibilities for applying high-temperature thermomechanical treatment in industry. Special investigations will be required, however, to find the effect

Card 2/3

L 9960-65

ACCESSION NR: AT4046864

of this structure on heat resistance. Orig. art. has: 2 figures.

"The X-ray analysis was made by D.I. Gurfel'."

ASSOCIATION: none

SUBMITTED: 16Jun64 ENCL: 00 SUB CODE: MM

NO REF SOV: 005 OTHER: 001

Card 3/3

ACCESSION NO: AP4009386 S/0126/63/016/006/0918/0921

AUTHORS: Sokolkov, Ye, N.; Surkov, Yu. P.

TITLE: Substructure formation in austenite steel during plastic deformation at high temperatures

SOURCE: Fizika metallov i metallovedeniye, v. 16, no. 6, 1963, 918-921

TOPIC TAGS: austenite steel, steel, steel substructure, plastic deformation, high temperature deformation, Cr-Ni-Mn steel, W alloy, Mo alloy, steel microstructure

ABSTRACT: The effect of temperature and deformation velocity on the formation of substructure in steel was studied in the process of plastic deformation at high temperatures. The samples consisted of Cr-Mn austenite steel (0.37% C) alloyed with W and Mo. Their substructure (revealed by etching) was studied microscopically and the structure patterns were photographed. It was established that a plastic deformation of the metal at 1000-1200C and at deformation velocity 0.015-0.0035 1/sec caused the appearance of substructure. The size of the substructure elements increased with the increase in temperature and with the decrease in deformation speed. The origin of the substructure observed was explained by the redistribution of dislocations in the process of deformation at high temperatures.

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ACCESSION NO: AP4009386

"We express our gratitude to V. D. Sadovskiy for his participation in the discussion of the results. V. A. Yudin conducted the electron-microscope studies."
Orig. art. has: 2 figures.

ASSOCIATION: Institut fiziki metallov AN SSSR (Institute of Physical Metallurgy AN SSSR)

SUBMITTED: 28Jul63 DATE ACQ: 03Feb64 ENCL: 00

SUB CODE: ML NO REF SOV: 005 OTHER: 006

Card 2/2

L 53754-65 EWT(m)/EWA(d)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)/EWA(c) Pf-4
MJW/JD/HW

ACCESSION NR: AR5008974 S/0137/65/000/001/I072/I072
669.15.018.85

33
32
B

SOURCE: Ref. zh. Metallurgiya, Abs. 1I476

AUTHOR: Glukhenko, Z. Ye.; Milovanov, Yu. F.; Sokolkov, Ye. N.; Yakhontov, A. G.

TITLE: Investigation of crystal lattice imperfections in EI-481 steel after ausforming

CITED SOURCE: Sb. rabot Kafedry obshch. fiz. Kirgosun-ta. Issled. po fiz. tverd. tela. Frunze, 1964, 163-172

TOPIC TAGS: metallurgy, ferrous metal, metal structure, metal testing, heat treatment, metal ausforming

TRANSLATION: A connection was found between hardness and elements of the fine structure: the size of the elements in the mosaic structure, microdistortion of the crystal lattice and grain disorientation. EI-481 alloy (0.34-0.41% C, 0.3-0.8% Si, 7.5-9.5% Mn, 11.5-13.5% Cr, 1.0-9.0% Ni, 1.25-1.55% V, 1.1-1.4% Mo, 0.25-0.45% Nb,

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ACCESSION NR: AR5008974

remainder Fe) was subjected to plastic deformation (rolling speed 1.5 m/min, reduction 25-30%) at 800, 900, 950, 1000 and 1100°, with subsequent quenching in water to prevent recrystallization. Some of the samples were age-hardened at 750° for four hours. This treatment breaks up the grain and distorts the crystal lattice. With an increase in the deformation temperature the total distortion of the structure is reduced until there is almost no noticeable interference line broadening at 1150°. Elimination of lattice imperfections with increased temperature is accompanied by softening of the material. With age-hardening, hardness is increased to a constant magnitude (290 kg/mm^2) and is independent of deformation temperature. Bibliography, 8 titles. B. Samarin.

SUB CODE: MM ENCL: 00

Card 2/2

SM[illegible], N.A. [illegible], M.A., BORZDYKOV, Yu.G.

Effect of temperature and degree of plastic deformation on the martensite of chromium-nickel-manganese austenitic steel. Izv. vys. ucheb. zav.; chern. met. 7 no.12:113-115 '64. (MIRA 18:1)

1. Ural'skiy politekhnicheskiy institut i Institut fiziki metallov AN SSSR.

L 17699-65 EWT(m)/EWP(w)/EWA(d)/EWP(k)/EWP(t)/EWP(b) Pf-4/Pad MJW/JD/HW

ACCESSION NR: AP4042041 S/0126/64/017/006/0845/0852

AUTHOR: Sadovskiy, V. D.; Sokolkov, Ye. N.; Petrova, S. N.; Pavlov, V. A.; Gaydukov, M. G.; Noskova, N. I.; Kagan, D. Ya.

TITLE: The effects of high-temperature thermo-mechanical treatment on the heat resistance of KhN77TYuR alloy

SOURCE: Fizika metallov i metallovedeniye, v. 17, no. 6, 1964, 845-852

TOPIC TAGS: nickel alloy, chromium containing alloy, aluminum containing alloy, creep rate, recrystallization, boron containing alloy, KhN77TYuR alloy, thermo mechanical treatment, heat resistance

ABSTRACT: The method of hot plastic deformation combined with quenching was used to enhance the stress-rupture strength of austenitic steels. The authors investigate the possibility of applying this combined method to KhN77TYuR, a ilmonic-type alloy. Specimens 11.5 x 11.5 x 70 mm were annealed at 1080C for 8 hr. and rolled with a reduction of 25% at a rolling speed of 1.5 m/min. The process

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of recrystallization was suppressed by water cooling the specimens immediately after plastic deformation. All specimens were aged at 750C for 16 hr. Hardness was 285 HB. At 550C and under a stress of 90 kg/mm^2, the rupture life was extended from 4 to 100 hr while the creep rate decreased from 4-8 x 10^{-2}% to 8 x 10^{-1}% per hr. Above the 500—600C range a deterioration of strength characteristics was observed. The authors attribute the adverse effect of the combined method at 750C to the recrystallization during testing and to a possible higher rate of coagulation of the strengthening phase. The decrease in the creep rate and the increase of the rupture life were verified by x-ray method. The authors point out the formation of a polygonized substructure and to a boundary distortion in the form of characteristic serration during high-temperature deformation. They contend that the substructural boundaries impeded the travel of dislocations during creep, while the distortion of the grain boundaries lowered the susceptibility to intercrystalline failure. The authors suggest that the method of investigation may be insufficiently developed for an exhaustive interpretation of the results obtained and of the peculiarities of the structural state of the material. Orig. art. has: 5 figures.

L 17699-65

ACCESSION NR: AP4042041

ASSOCIATION: Institut fiziki metallov AN SSSR (Institute of the Physics of Metals AN SSSR)

SUBMITTED: 12Jul63 ENCL: 00 SUB CODE: MM

NO REF SOV: 012 OTHER: 008

Card 3/3

SOKOLKOV, Ye.N.

Effect of the temperature of plastic deformation on the dislocation structure of silicon iron. Fiz. met. i metalloved. 18 no.2:226-232 Ag '64. (MIRA 18:8)

1. Institut fiziki metallov AN SSSR.

L 16619-65 EWT(m)/EWP(w)/EWA(d)/EWP(t)/EWP(k)/EWP(b) Pf-4 ASD(m)-3
MJW/JD/HW
ACCESSION NR: AP4048773 S/0126/64/018/004/0584/0589

AUTHOR: Sokolkov, Ye. N.; Sadovskiy, V. D.

TITLE: Effect of high-temperature thermomechanical treatment on impact endurance of structural low-alloy steels 18 18 B

SOURCE: Fizika metallov i metallovedeniye, v. 18, no. 4, 1964, 584-589

TOPIC TAGS: low alloy structural steel, 30KhGSA steel, 20KhN4 steel, steel impact endurance, high temperature thermomechanical treatment, thermomechanical treatment

ABSTRACT: Low-alloy structural steels—30KhGSA and 20KhN4 (0.23%C, 0.6%Cr, 4.0%Ni, 0.5%Mn)—were subjected to high-temperature thermomechanical treatment (VTMO) and tested for endurance in repeated impact bending. The VTMO consisted in heating steel billets to 1200C, furnace cooling to 900C, rolling at this temperature with a 25—30% reduction, water quenching, and tempering at temperatures ranging from 200 to 650C for 4—6 hr. In tests, the impact energy of 15 kg·cm was applied at a frequency of 600 per min. The test results showed that the VTMO increased the impact endurance of both steels

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(i.e., the number of impacts sustained to failure) by 2—3 times that of conventional heat treatment. The effect of VTMO depended on the tempering temperature. Tempering at 200—375C tripled the impact endurance, whereas tempering at 550—650C increased it only 1.5 times. Prolonging tempering at 550C to 8 hr had no additional effect on the impact endurance. Examination of the microstructure of fractured specimens showed that, regardless of the temperature of tempering, the VTMO promotes development of the "scraped" or "lapped" zone at the fracture surface, which is associated with a slow development of fatigue cracks. The VTMO also suppresses brittle intergranular failure in the zone of accelerated development of a crack. Higher impact endurance is also associated with the improved homogeneity of the structure, which probably is a determining factor in the effect of the VTMO. A higher hardness of the material resulting from such treatment also favorably affects the impact endurance. Orig. art. has: 5 figures.

ASSSOCIATION: Institut fiziki metallov AN SSSR (Institute of the Physics of Metals, AN SSSR)

L 16619-65
ACCESSION NR: AP4048773

SUBMITTED: 20Dec63 ENCL: 00 SUB CODE: MM

NO REF SOV: 012 OTHER: 000 ATD PRESS: 3147

Card 3/3

ASRATYAN, E.A., VORONIN, L.G.; GRASHCHENKOV, N.I.; PARIN, V.V.; RUSINOV, V.S.; SOKOLOV, Ye.N., prof.; CHERNOV, A.G.; NIKOLAYEV, V.R., red.

[Problems of contemporary physiology] Problemy sovremennoi fiziologii. Moskva, Izd-vo "Znanie," 1965. 31 p. (Novoe v zhizni, nauke, tekhnike. VIII Seriia: Biologiia i meditsina, no.12) (MIRA 18:6)

1. Vsesoyuznoye fiziologicheskoye obshchestvo imeni I.P. Pavlova. 2. Chlen-korrespondent AN SSSR (for Asratyan, Grashchenkov). 3. Chlen-korrespondent Akademii pedagogicheskikh nauk RSFSR (for Voronin). 4. Deystvitel'nyy chlen AMN SSSR (for Parin). 5. Chlen-korrespondent AMN SSSR (for Rusinov).

L 11204-66 EWT(m)/EWA(d)/T/EWP(t)/EWP(z)/EWP(b)/EWA(c) MJW/JD

ACC NR: AP5026363 SOURCE CODE: UR/0370/65/000/005/0149/0155

44,55

AUTHOR: Smirnov, M. A. (Sverdlovsk); Sokolkov, Ye. N. (Sverdlovsk); Shteynberg, M. M. (Sverdlovsk)

44,55 44,55 44,55

ORG: none

TITLE: Effect of plastic deformation temperature on the kinetics of age hardening in heat resistant austenite steel

SOURCE: AN SSSR. Izvestiya. Metally, no. 5, 1965, 149-155

TOPIC TAGS: austenite steel, carbide phase, steel microstructure, hardness, metal aging, plastic deformation, metal hardening, heat resistant steel, metal heat treatment, solid mechanical property, phase composition

ABSTRACT: The effect of the temperature of plastic deformation on the kinetics of age hardening in heat resistant austenite EI481 and EI612K steels was investigated. EI48 steel was reinforced with $Cr_{23}C_6$ and VC carbides and EI612K steel was reinforced with γ'-phase and some TiC. Steel samples (13 × 13 × 70 mm) were heated to 1180°C, held at this temperature for 2 hours and then cooled to 110-400°C at a rate of 500°C/minute. Next, the steel samples were soaked for 3 minutes, first in a furnace at 1100-700°C and then in a salt bath at 600° and 400°C. Following this, one portion of samples was deformed prior to hardening (reduced by 25-28%), and another portion was hardened directly. Some samples were quenched in water (directly from 1180°C) and subjected to deformation at room temperature. The EI481 steel samples were hard-

UDC: 669.14.018.44-157.8

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ened at 650°, 700°, 750°, and 800°C; and EI612K steel samples were hardened at 700°, 750°, and 800°C. Plastic deformation on steel age hardening increases with deformation temperature as well as with the rise in age hardening temperature. In contrast to EI612K steel, high-temperature plastic deformation in EI481 carbide steel results in reduced strength due to age hardening at 700°-800°C. Cold and warm plastic deformations accelerate these coagulation processes in the hardening phase which are beneficial from the material hardness viewpoint. For EI612K steel, the domains located next to the grain boundaries are more dense after the high-temperature plastic deformation than either after direct quenching or after warm deformation.

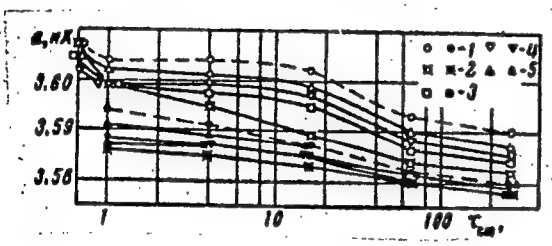

Fig. 1. Variation of lattice parameter "a" of the solid solution of EI481 steel as a function of time. (Light symbols indicate 650°C; solid symbols indicate 800°C). 1--directly quenched samples; 2--plastic deformation at 20°C; 3--plastic deformation at 600°C; 4--plastic deformation at 900°C; 5--plastic deformation at 1100°C.

L 11204-66

ACC NR: AP5026363

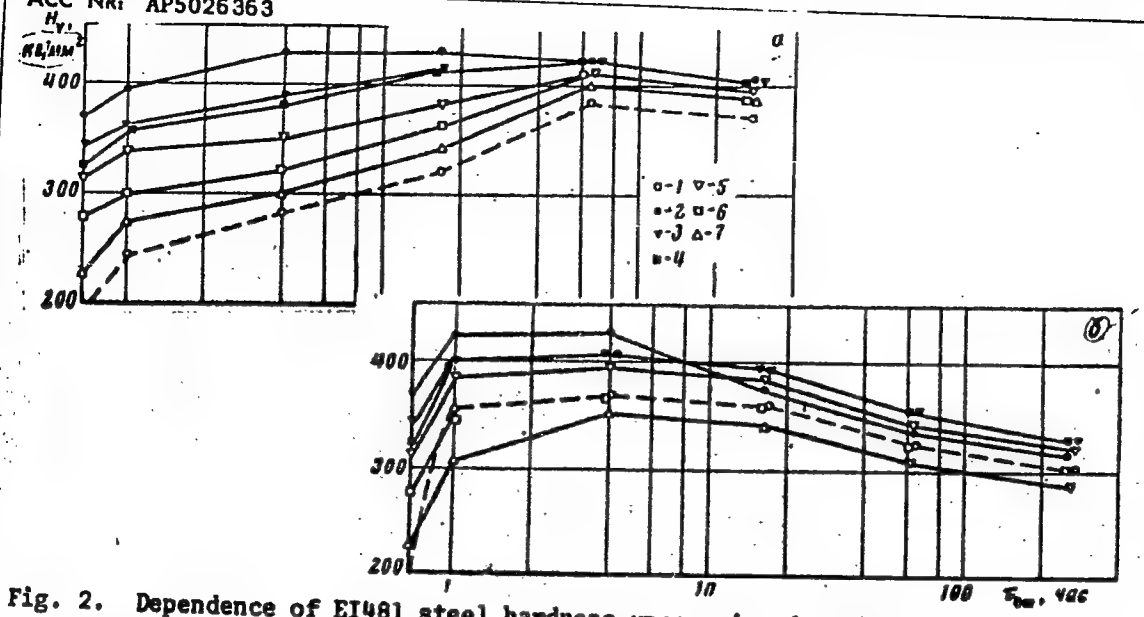

Fig. 2. Dependence of EI481 steel hardness upon aging duration at 650°C. a--650°C; b--750°C; where numbers correspond to various steel treatment conditions: 1--quenched steel; 2--deformation at 20°C; 3--deformation at 400°C; 4--deformation at 600°C; 5--deformation at 900°C; 6--deformation at 1000°C; 7--deformation at 1100°C.

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L 11204-66

ACC NR: AP5026363

3

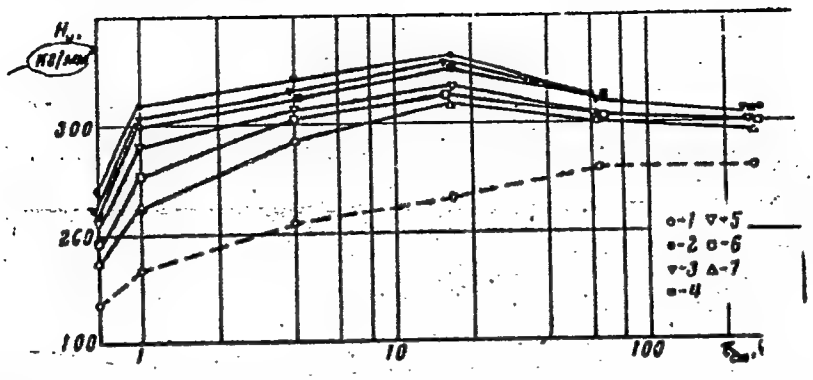

Fig. 3. Dependence of EI612K steel hardness upon aging duration at 700°C after various treatment: 1--quenched steel; 2--deformation at 20°C; 3--deformation at 400°C; 4--deformation at 600°C; 5--deformation at 900°C; 6--deformation at 1000°C; 7--deformation at 1100°C.

The steel microstructures were determined in cooperation with V. A. Yudin. Orig. art. has: 4 figures, 3 tables.

44,55

SUB CODE: 11/ SUBM DATE: 06May65/ ORIG REF: 003/ OTH REF: 001

Card 1/1

Character [illegible] of the initial stages of creep in the "Nimonik"-type alloy following high-temperature thermomechanical treatment. Fiz. met. i metalloved. 19 no.1:101-104 Ja '65. (MIRA 18:4)

1. Institut fiziki metallov AN SSSR.

L 39713-65 EWP(k)/EWA(c)/EWT(m)/EWP(b)/T/EWA(d)/EWP(t) Pf-4 JD/HW

ACCESSION NR: AP5006328 S/0126/65/019/002/0226/0240

AUTHOR: Sokolkov, Ye. N.; Sodovskiy, V. D. 30 27 B

TITLE: Ausforming of metals and alloys 14

SOURCE: Fizika metallov i metallovedeniye, v. 19, no. 2, 1965, 226-240

TOPIC TAGS: ausforming, hardening method, structural steel, austenitic steel, high temperature metal 14

ABSTRACT: The authors review ausforming as a method for hardening metals and alloys. The method was introduced at the Institut fiziki metallov (Institute of Physics of Metals) in 1954. Ausforming consists of a combination of plastic deformation at temperatures higher than recrystallization temperatures, and tempering (avoiding recrystallization processes). The method is based on taking advantage of the peculiar structural state which arises during high temperature plastic deformation. This structural state is distinguished by serration of the grain boundaries and by the appearance of a system of slightly disoriented fragments in the body of the grain with a characteristic fine structure. These structural imperfections, combined with concentration irregularities which arise during high temperature

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L 39713-65

ACCESSION NR: AP5006328

3

plastic deformation, improve the thermal and mechanical stability of the alloys. Ausforming improves the strength and ductility of structural steel alloys as well as reducing reversible and irreversible tempering brittleness and increasing fatigue strength. The fragmented structure and serrated grain boundaries result in improved refractory properties (reduction in creep rate, improvement in durability and ductility). This means that ausforming may be used for hardening refractory steels and alloys at temperatures of 600-650°, and in short tests (less than 10 hours) up to 900°. Ausforming is already industrially feasible, and it is recommended that the method be used for hardening alloys to be used in parts which will operate at temperatures of 500-650°. Orig. art. has: 14 figures and 1 table.

ASSOCIATION: Institut fiziki metallov AN SSSR (Institute of Physics of Metals, Academy of Sciences SSSR)

SUBMITTED: 09May64 ENCL: 00 SUB CODE: MM

NO REF SOV: 057 OTHER: 004

Card 2/2 16

L 63499-65 EWP(k)/EWP(z)/EWA(c)/EWT(m)/EWP(b)/T/EWA(d)/EWP(w)/EWP(t) NJW/JD/HW

ACCESSION NR: AP5018862 UR/0126/65/020/001/0120/0127
539.389:669.15

AUTHOR: Sokolkov, Ye. N.; Smirnov, M. A.; Shteynberg, M. M.; Nichkova, M. M.

TITLE: Effect of the temperature of plastic deformation on the kinetics of aging of heat-resistant austenitic steel strengthened by carbide precipitation

SOURCE: Fizika metallov i metallovedeniye, v. 20, no. 1, 1965, 120-127

TOPIC TAGS: steel treatment, thermomechanical treatment, austenitic chromium steel, nickel containing steel, manganese containing steel, carbide precipitation strengthened steel /EI481 steel

ABSTRACT: The effect of the temperature of plastic deformation on the kinetics of aging of heat-resistant austenitic EI481 steel [0.36% C, 12.4% Cr, 7.5% Ni, 8.9% Mn, 1.23% Mo, 1.25% V, 0.25% Ni, and 0.5% Si] has been investigated. The steel was austenitized at 1180C, cooled rapidly to 1100—400C or to room temperature, rolled with reductions of up to 28%, and immediately water quenched. This was followed by aging for 1—256 hr at 650, 700, 750, and 800C. It was found that plastic deformation at all the investigated temperatures intensified decomposition of austenite and coagulation of the carbide phase and facilitated recrystallization during subsequent aging. The

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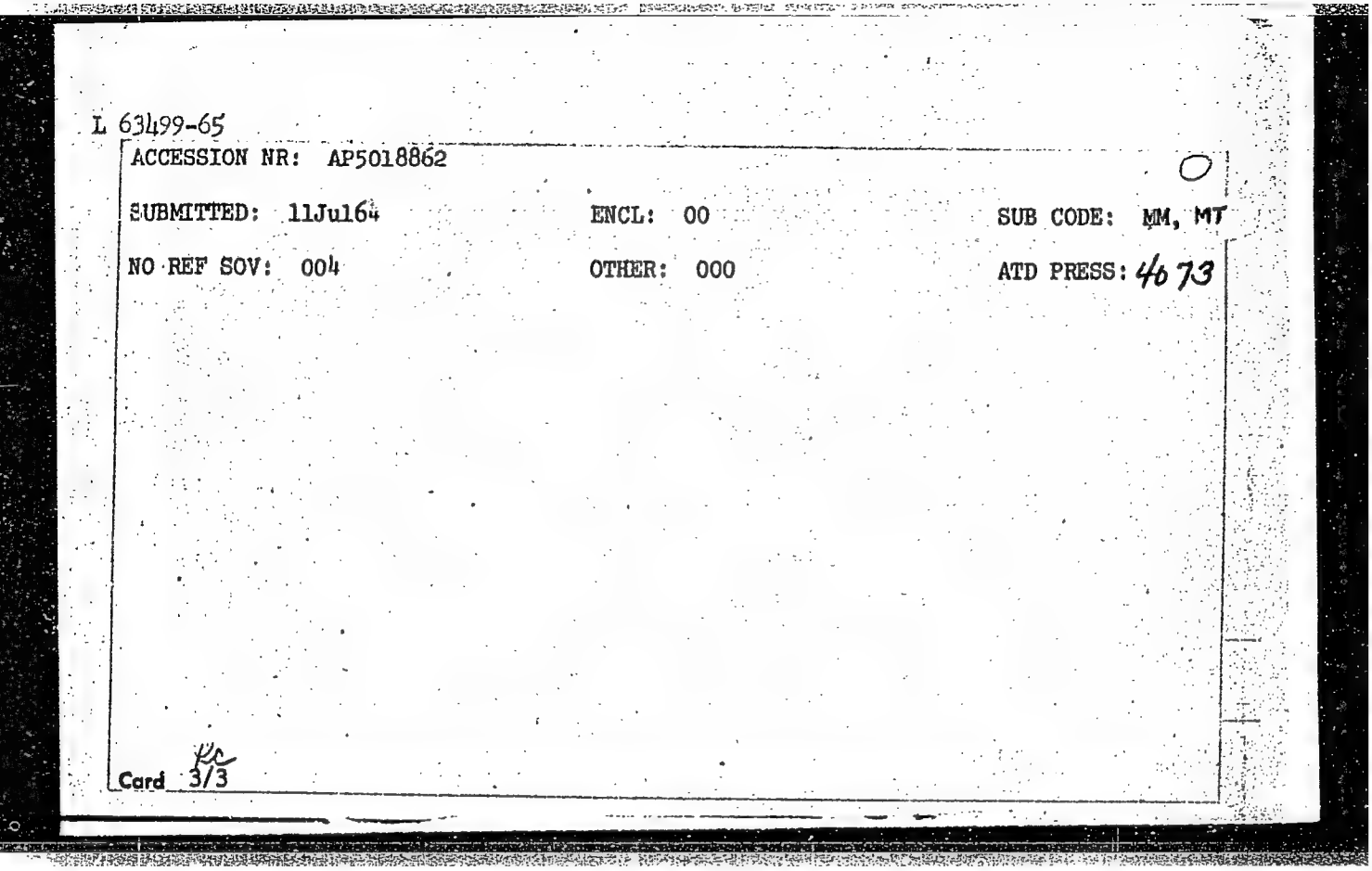
L 63499-65

ACCESSION NR: AP5018862

lower the deformation temperature, the more intense the austenite decomposition, e.g., after aging for 1 hr at 650, austenite decomposition was 30% in the metal deformed at 20C compared with 11% in conventionally quenched metal. On cooling from the austenitizing temperature (1180C) to 1100—700C, a partial decomposition of the solid solution occurred. In specimens quenched from these temperatures without deformation, a noticeable decrease in the strengthening effect of aging at 700—800C was observed. Plastic deformation at 20C and at 1100—400C produced noticeable strengthening only by aging at 650C. With increasing aging temperature (700—800C), an appreciable increase in strengthening as compared with conventional heat treatment was obtained only after deformation in the 900—400C range. It is concluded that in steels such as EI481, which are strengthened by carbide precipitation, no significant strengthening by thermomechanical treatment can be obtained owing to an intensive coagulation of the precipitated carbide phase. On the contrary, in steel such as EI612K, in which an intermetallic compound is precipitated, a higher degree of strengthening can be obtained by changing the kinetics of aging since the coagulation of the strengthening phase proceeds at a substantially lower rate. Orig. art. has: 5 figures and 2 tables. [MS]

ASSOCIATION: Institut fiziki metallov AN SSSR (Institute of Metals Physics, AN SSSR); Ural'skiy politekhnicheskiy institut im. S. M. Kirova (Ural Politechnical Institute)

Card 2/3



L 63499-65

ACCESSION NR: AP5018862

SUBMITTED: 11Jul64 ENCL: 00 SUB CODE: MM, MT

NO REF SOV: 004 OTHER: 000 ATD PRESS: 4073

Card 3/3

L 8914-66 EWT(m)/EWA(d)/EWP(t)/EWP(z)/EWP(b) MJW/JD

ACC NR: AP5027141 UR/0126/65/020/004/0561/0565

AUTHOR: Sokolkov, Ye. N.; Surkov, Yu. P.; Gurfel', D. I.

ORG: Institute for the Physics of Metals, AN SSSR (Institut fiziki metallov AN SSSR)

TITLE: Effect of conditions of high temperature heat and mechanical treatment on the thin crystalline structure of chromium-nickel-manganese austenitic steel

SOURCE: Fizika metallov i metallovedeniye, v. 20, no. 4, 1965, 561-565

TOPIC TAGS: crystal structure, austenite steel, chromium steel, nickel steel, manganese steel, work hardening, metal heat treatment, plastic deformation/ EI481 chromium steel

ABSTRACT: A study was made of the fine crystal structure of chromium-nickel-manganese steel EI481 as a function of the conditions of high temperature heat and mechanical treatment: temperature and degree and rate of deformation. Samples with dimensions 50 x 50 x 75 mm were heated to 1200°C, held there for 1.5 hours, and deformed at this temperature and at 1100 and 1000° after cooling in the furnace

Card 1/3 UDC: 669.15.018.45

ACC NR: AP5027141

Deformation was done by 25-30% upsetting in a press at a rate of 0.015, 0.0075, and 0.005 1/sec (the degree of deformation was evaluated by the change in height of the sample). After deformation (within 1-2 seconds), the samples were quenched in water. The test samples were subjected to metallographic and x-ray structural analysis. Study of the microstructure (illustrated in the article) shows that, as a result of high temperature heat and mechanical treatment, there appears a structure whose elements depend substantially on temperature and the rate and degree of plastic deformation. Treatment at 1200° at a minimum deformation rate leads to formation of subgrains with an average size of 30-40 microns. A decrease in deformation temperature to 1100° decreases the size of the subgrains to 15-20 microns. X-ray studies show that, in samples which have undergone conventional annealing, the grains have a sufficiently clear character with a small radial washing out, which probably indicates a certain elastic microdeformation of the lattice. For material subjected to high temperature heat and mechanical treatment, the x-ray studies indicate the formation within the grains of large mutually unoriented regions of the crystal lattice, that is, fragments. The magnitude of the plastic deformation has a complicated effect on the formation of the thin crystalline structure. At small reductions, the fragmentation of the structure is observed mainly in regions near the

L 8914-66

ACC NR: AP5027141

grain boundaries while, with an increased degree of deformation, this process gradually extends over the whole volume of the grain. Orig. art. has: 3 figures.

SUB CODE: MM/ SUBM DATE: 15Aug64/ ORIG REF: 011

OTH REF: 004

QC

Card 3/3

ACC NR: AP6021070 SOURCE CODE: UR/0148/66/000/006/0125/0130

AUTHOR: Shteynberg, M. M.; Smirnov, M. A.; Zhuravlev, L. G.; Sokolkov, Ye. N.

ORG: Ural Polytechnic Institute (Ural'skiy politekhnicheskiy institut); Institute of Metal Physics, AN SSSR (Institut fiziki metallov AN SSSR)

TITLE: Effect of the temperature of plastic deformation on the mechanical properties of high-temperature austenitic steels

SOURCE: IVUZ. Chernaya metallurgiya, no. 6, 1966, 125-130

TOPIC TAGS: high temperature steel, austenitic steel, plastic deformation, ultimate strength, plastic strength/EI481 high-temperature steel, EI612K high-temperature steel

ABSTRACT: This effect was investigated with respect to austenitic high-temperature steels EI481 (Cr-Ni-Mn) and EI612K (Ni-Cr) after they were subjected to 25-28% reduction by hot or cold rolling. To this end the specimens were subjected to tensile tests at room temperature and at 650°C. Findings: for steel EI481 in aged state (two-stage aging: 660°C for 16 hr and 760°C for 16 hr) under conditions of hot tests maximum strength is attained following deformation at 600°C, and maximum plasticity, at 1000-1100°C; in the latter case, altering the re-

Card 1/2 UDC: 669.14.018.45-12:620.17

L 41271-66
ACC NR: AP6021070

gime of aging (reducing the aging temperature to 730°C) makes it possible to optimize both strength and plasticity. For steel EI612K (single-stage aging at 700°C for 25 hr), plastic deformation over the entire range of temperatures considered (up to 1100°C) enhances the steel's strength but its plasticity remains low; this can be remedied by introducing two-stage aging, but then strength is not as high. By contrast with EI481 steel, the optimal mechanical properties in hot tests of EI612K steel are assured not by high-temperature deformation but by warm and, particularly, cold deformation. The differences in the strain-hardening kinetics of these steels are chiefly due to the differences in their kinetics of aging and in the distribution and, particularly, coagulation rate of the particles of their hardening phases (carbide phase in the case of EI481 steel and intermetallic phase in the case of EI612K steel). Orig. art. has: 2 figures and 1 table.

SUB CODE: 11,13/ SUBM DATE: 02Jul65/ ORIG REF: 004

Card 2/2

L 18738-66 EWT(m)/EWA(d)/EWP(t) JD/WB

ACC NR: AP6005136 SOURCE CODE: UR/0126/66/021/001/0048/0053

AUTHOR: Shklyar, R. S.; Smirnov, M. A.; Shteynberg, M. M.; Sokolkov, Ye. N.; Farber, V. M.

ORG: Ural Polytechnic Institute im. S. M. Kirov (Ural'skiy politekhnicheskiy institut); Institute of Metal Physics, AS USSR (Institut fiziki metallov AN SSSR)

TITLE: Investigation of the fine structure of austenitic steel with intermetallide hardening, deformed over a broad range of temperatures

SOURCE: Fizika metallov i metallovedeniye, v. 21, no. 1, 1966, 48-53

TOPIC TAGS: fine structure, austenitic steel, x ray analysis, plastic deformation, metal grain structure/EI612K austenitic heat resistant steel

ABSTRACT: Knowledge of the type of fine structure arising in the hot- and cold-worked metal as a function of the regime of its deformation is a prerequisite to selecting the optimal regimes of its hardening. In this connection, the authors radiographically examined fine structure of austenitic heat-resistant steel EI612K (0.08% C, 14.9% Cr, 36.1% Ni, 3.25% W, 3.8% Co, 0.65% Ti, 1.26% Al) according to the shape, structure and intensity of the $(220)_\alpha$ and $(311)_\beta$ reflexes, with measurements of the lattice constant of the solid solution. Hardening phases were isolated by means of electrolytic dissolution. Texture was examined following various regimes of defor-

UDC: 669.15.018.45 + 157.97

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L 18738-66

ACC NR: AP6005136

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mation. Prior to their radiographic examination the specimens were heated to 1180°C for 2 hours, whereupon they were partially cooled at an average rate of 500 deg/min to various temperatures within the 1100-400°C range. The exposure to various partial-cooling temperatures in the furnace (1100-700°C) and in a salt bath (600 and 400°C) lasted 3 minutes. After this part of the specimens was deformed at these temperatures in a grooved rolling mill with 25-30% reduction in area and with subsequent water quenching, while the other part was quenched without prior deformation. It was established that quick partial cooling leads to the comminution of grains into fragments. Plastic deformation at 1100 and 1000°C intensifies this fragmentation of structure. At lower deformation temperatures (900-20°C) the formation of fragmented structure is not observed. Decomposition of the supersaturated solid solution was observed throughout the temperature range investigated. Texture-formation occurs already in the presence of relatively small deformation (20-30%) and this must be taken into account, since texturedness of the material complicates the analysis of radiographic data. Roentgenograms of the specimens display a large number of Laue reflections, as well as isolated distinct reflexes $(220)_\alpha$ and $(311)_\beta$. The Laue reflections often consist of two spots displaced relative to each other and linked by a common background; the reflexes $(220)_\alpha$ and $(311)_\beta$ became subdivided into several overlapping subspots; all this points to an intensive fragmentation of the grains, particularly on partial cooling to 800-700°C. Orig. art. has: 3 figures and 2 tables.

SUB CODE: 11, 13, 20/ SUBM DATE: 20Jan65/ ORIG REF: 008/ OTH REF: 001

Card 2/2 SPW

ACC NR: AT6034463 (A) SOURCE CODE: UR/0000/66/000/000/0265/0271

AUTHOR: Surkov, Yu. P.; Sadovskiy, V. D.; Sokolkov, Ye. N.; Pavlov, V. A.; Gaydukov, M. G.

ORG: none

TITLE: Effect of high temperature thermomechanical treatment at a small deformation rate on the heat resistance of Type KhN77YuR alloy

SOURCE: AN SSSR. Institut metallurgii. Svoystva i primeneniye zharoprochnykh splavov (Properties and application of heat resistant alloys). Moscow, Izd-vo Nauka, 1966, 265-271

TOPIC TAGS: metal heat treatment, heat resistance, metal deformation, metal recrystallization

ABSTRACT: High temperature thermomechanical treatment, concluding with deformation of the material at increased temperatures, and then cooling, eliminating the development of recrystallization due to the birth and growth of new grains, leads to a considerable improvement in the heat resistance properties of steels and alloys. The present article considers the effect of high temperature thermomechanical treatment at a small deformation rate (0.003-0.004 sec^{-1}) on the heat resistance of alloy KhN77TYuR. Samples with a size of 50 x 50 x 75 mm were heated to a temperature of

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L 23290-65 EWT(l)/EWT(m)/EPF(c)/EPR/EWP(j)/EEC(t)/T Pc -4/Pr-4/Ps-4/Peb IJP(c)/
ACCESSION NR: AP5000915 RPL WW/RM S/0020/64/159/004/0831/0834

AUTHOR: Belov, V.F.; Vishnyakova, T.P.; Makarov, Ye. F.; Paushkin, Ya.; M., Sokolitskaya, T.A.; Stukan, R.A.; Trukhtanov, V.A.; Gol'danskiy, V. I. (Corresponding member AN SSSR)

TITLE: The study of ferrocene copolymers by means of the Moessbauer effect

SOURCE: AN SSSR. Doklady, v. 159, no. 4, 1964, 831-834

TOPIC TAGS: ferrocene copolymers, ferroorganic polymer, Moessbauer effect, polymer crosslinking, gamma absorption spectrum

ABSTRACT: The electronic structure of iron in ferrocene polymers and the crosslinking of such polymers was studied from Moessbauer spectra, measuring the dependence of the resonant absorption of γ-ray quanta on the relative velocities of source and absorber. Cobalt-57 served as the source, and the polymers used as absorbers included soluble and insoluble polyferrocenes, polyvinylferrocenes, and copolymers of ferrocene with acetone, naphthalene, alpha-bromonaphtlalene, p-dichlorobenzene, salicylaldehyde, benzaldehyde, and phthalaldehyde. All soluble polymers gave spectra at 80K similar to those of ferrocene and its derivatives, with doublets and approximately 10% Moessbauer effects. At room temperature, the Moessbauer effect of such polymers was smaller than for ferrocene,

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indicating the high movability of ferrocenyl radicals in the polymeric structure. Insoluble polymers showed a marked decrease in quadrupole scattering as compared with ferrocene derivatives or soluble polymers. The spectra showed characteristics observed for ferricene salts and the formation of ferricene cations by electron detachment from iron. Moessbauer effects at room temperature were significantly higher than the effects measured for the soluble polymers. The difference is ascribed to the crosslinked structure and rigidity of molecules in the insoluble polymers. The presence of two doublets in the 80K spectra of insoluble polymers corresponds to the electronic structures of iron in conjugated three-dimensional links and in ordinary ferrocenyl links of the linear polymer fraction. Thus, the Moessbauer spectra can be evaluated to estimate the degree of crosslinking in polymers of ferrocene. By accounting for the concentration of iron in the polymers and for the dimensions of absorbers, the measured values can be reduced to the absolute probability of Moessbauer effects in ferrocene polymers, $T_{\text{ф}}$. The degree of crosslinking is defined by the relation

$$\xi = \frac{T'_{a_1}}{T'_{a_1} + T'_{a_2}} \cdot 100\%,$$

L 23290-65
ACCESSION NR: AP5000915

2

where a_1 refers to linear and a_2 to crosslinked fractions of the polymer. Orig. art. has: 1 table, 1 figure and 2 formulas.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Chemical physics institute, Academy of Sciences, SSSR); Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti imeni I. M. Gubkina (Moscow Institute of the Petrochemical and gas Industry)

SUBMITTED: 22Jul64 ENCL: 00 SUB CODE: OC

NO REF SOV: 006 OTHER: 001

Card 3/3

SOKOLNICKI, Eugeniusz, inz.

Electric relay with magnetic hermetic contactor. Przegl elektrotechn 37 no.12:513 '61.

(Electric relays)

SOKOLNICKI, Eugeniusz, inz.

Relay with sealed-in magnetic contact. Lacznosc Wroclaw 5:193-195 '62.

1. Instytut Elektrotechniki, Zaklad Zautomatyzowanych Napedow, Warszawa.

SOKOLNICKI, Julian

Postoperative parotitis. Polski przegl. chir. 28 no.8:847-849 Aug 56.

1. Z II Kliniki Chirurgicznej A.M. w Poznaniu. Kier.: prof. dr. Drews. Poznan, ul. Przybyszewskiego 49.
(SURGERY, OPERATIVE, complications, postop. parotitis, prev. (Pol))
(PAROTITIS, prevention and control, postop. in general surg. (Pol))

SOKOLNICKI, Julian; TYSPER, Zofia

Remote results following partial gastrectomy in peptic ulcer with special reference to hematological studies. Polski przegl. chir. 35 no.3:219-224 '63.

1. Z II Kliniki Chirurgicznej AM w Poznaniu Kierownik: prof. dr R. Drews.
(GASTRECTOMY) (ANEMIA) (ANEMIA, MACROCYTIC)
(ANEMIA, HYPOCHROMIC) (PEPTIC ULCER)

FIBAK, Jan; SOKOLNICKI, Julian

Histologically immature thyroid adenoma. Pol. przegl. chir. 35 no.4:279-283 '63.

1. Z II Kliniki Chirurgicznej AM w Poznaniu Kierownik: prof. dr R. Drews.
(ADENOMA) (THYROID NEOPLASMS) (STATISTICS) (GOITER)

SOKOLNICKI, Julian; TYSPER, Zofia

Calcium-phosphorus metabolism disorders following gastrectomy in peptic ulcer. Pol. przegl. chir. 35 no.5:463-467 '63.

1. Z II Kliniki Chirurgicznej AM w Poznaniu Kierownik: prof. dr R. Drews.

(PEPTIC ULCER) (POSTGASTRECTOMY SYNDROMES)
(CALCIUM METABOLISM DISORDERS)
(PHOSPHORUS METABOLISM DISORDERS)
(BLOOD CHEMICAL ANALYSIS)

FIBAK, Jan, SOKOLNICKI, Julian

Use of I-131 in the diagnosis of thyroid cancer. Polski przegl. chir. 35 no.9:949-953'63.

1. Z II Kliniki Chirurgicznej AM w Poznaniu. Kierownik: prof. dr. R.Drews.

*

SOKOLNICKI, Julian

Calcium metabolism in gastric and duodenal ulcer following partial gastrectomy. Pozn. tow. przyjac. nauk wydz. lek. 29:245-268 '64.

[illegible], Julian; [illegible], Bogumil

Remote results of the treatment of rectal cancer. Nowotwory 14 no.3:275-281 Jl-S '64

1. [illegible] Klinki Chirurgicznej Akademii Medycznej w Poznaniu (Kierownik: prof. dr. med. [illegible]).

KOMICKI, Julian; TYSZER, Zofia

Remote results of gastrectomy in peptic ulcer with special reference to hematological studies. Pol. przegl. chir. 36 no.5:[illegible] My '64.

1. Z I. Kliniki Chirurgicznej Akademii Medycznej w Poznaniu (Kierownik: prof. dr R. Drews).

SOKOLNICKI, Julian

Postoperative psychoses and goiter surgery. Endokr. Pol. 16 no.5: 511-515 '65.

1. II Klinika Chirurgiczna AM w Poznaniu (Kierownik: prof. dr. R. Drews).

SOK[illegible], [illegible]n

Endometriosis of large intestine as a surgical problem. Pol. tyg. lek. 20 no.34:1289-1291 23 Ag '65.

1. Z II Kliniki Chirurgicznej AM w Poznaniu (Kierownik: prof. dr. Roman Drews).

[redacted], [redacted]

Control studies with the use of iodine-131 after thyroid cancer surgery. Endokr. Pol. 16 no.5:517-523 '65.

1. II Klinika Chirurgiczna AM w Poznaniu (Kierownik: prof. dr. H. Drewa).

SOKOL'NIK, G.M., inzhener; SOKOLOV, V.P., inzhener.

Experience with burning Bashkir coal. Energetik 3 no.2:1-3 F '55.
(MLRA 8:1)

(Bashkiria--Coal) (Combustion)

ZAVYALOV'SKIY, A.R.; KHAZANOV, A.I., kand. med. nauk; ZAV[illegible]
SOKOL'NIKAS, Ya.Yo.

Antirelapse preventive treatment of peptic ulcer. Sov. m[illegible] 28 no.1: 41-45 Ja '65. (MIRA 18:4)

1. Glavnyy voyennyy gospital' imeni Burdenko, Moskva

POLYANIN, D.V.; ZOTOV, G.M.; GRYAZNOV, E.A.; MENZHINSKIY, Ye.A.; RUBININ, A.Ye.; CHEBOTAREVA, Ye.D.; ZAKHMATOV, M.I.; OKUNEVA, L.P.; SHMELEV, V.V.; STULOV, A.A.; POKROVSKIY, A.N.; SHIL'DKRUT, V.A.; IVANOV, A.S.; NABOROV, V.B.; FINOGENOV, V.P.; KUR'YEROV, V.G.; KHRAMTSOV, B.A.; BATYGIN, K.S.; BOGDANOV, O.S.; KROTOV, O.K.; GONCHAROV, A.N.; KRESTOV, B.D.; LYUBSKIY, M.S.; SOKOL'NIKOV, G.O.; KAMENSKIY, N.N.; YASHCHENKO, G.I.; SABEL'NIKOV, L.V.; GERCHIKOVA, I.N.; FEDOROV, B.A.; STEPANOV, G.P.; BORODAYEVSKIY, A.D.; INGATUSHCHENKO, S.K.; VARTUMYAN, E.L.; KAPELINSKIY, Yu.N., red.; MAYOROV, B.V., red.; NABOROV, V.B., red.; SOLODKIN, R.G., red.; DROZDOV, A.G., red.; ROSHCHINA, L., red.; SOLOV'YEVA, G., mladshiy red.; CHEPELEVA, O., tekhn. red.

[The economy of capitalist countries in 1961; economically developed countries] Ekonomika kapitalisticheskikh stran v 1961 godu; ekonomicheski razvitye strany. Pod red. IU.N.Kapelinskogo. Moskva, Sotsekgiz, 1962. 447 p. (MIRA 16:2)
(Economic history)

SOKOLNIKOV, K. I., and MOLSEIEV, V. N.,

"Hot Rolling of Commercial Titanium and Several of Its Alloys," Titan i yego splavy; Metallurgiya i metallovedeniye (Titanium and Its Alloys; Metallurgy and Physical Metallurgy), Moscow, Izd-vo AN SSSR, 1958. 162.

Ministry of the Aircraft Industry of the USSR.

SOKOL'NIKOV, N.M.

98-7-6/20

AUTHOR: Sokol'nikov, N.M., Engineer

TITLE: Peculiarities of Ice and Temperature Conditions in Deep Water Reservoirs (Osobennosti ledotermicheskogo rezhima v glubokom vodokhranilishche)

PERIODICAL: Gidrotekhnicheskoye Stroitel'stvo, 1957, # 7, p 25-29 (USSR)

ABSTRACT: After construction of the Ust-Kamenogorsk Hydroelectric Power Plant (Ust'-Kamenogorskiy Ges), a water reservoir with a capacity of 0.66 cu km was created. The lower parts of the reservoir had depths of more than 40 m. The winter discharge amounted to 220 cu m/sec. The total winter delivery was approximately 3.5 cu km. For the study of temperature conditions in the reservoir, thermic cross-sectional measurements were taken twice every month at points located 0.2 and 1.0 km upstream from the dam. Ice conditions of the tailrace were observed periodically. Ice formed on the reservoir much sooner than on the river, the difference being 10 days. The first river ice formed approximately 60 km from the dam. The lower part of the reservoir was covered with ice within 7 days, apparently the result of considerable thermic reserves in the reservoir. Temperature conditions prevailing in the water reservoir showed the following peculiarities: during the winter the temperature of the water

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Peculiarities of Ice and Temperature Conditions in Deep Water Reservoirs

stayed around 0 °C after the ice flow. The mean temperature of the water adjacent to the dam was above freezing during the entire winter period. Up to the middle of January a gradual drop of temperature was observed, followed by a slow rise during the middle of March. The first drop in temperature resulted from the exchange of warm surface water by the influx of water at near-freezing temperatures, which entered the reservoir after the ice cover had formed. At this time the average temperature of the water was 2.75 °C. During the second period, equilibrium was reached between the flow of warmer water and the thermic exchange from the bottom to the higher layers. The third period was characterized by an increased flow of warm water from the bottom of the reservoir. In the deeper parts of the reservoir, the reverse stratification was maintained, i.e., the water temperature decreased towards the surface. The upper level, with a thickness of 30 to 35 m, had a temperature of 0.2 to 0.4 °C, whereby the lower level, with a thickness of 10-15 m, showed a fast rise in temperature to 4 °C, with temperatures exceeding 4 °C near the bottom. The reason for this occurance was the difference in density, causing the warmer

Peculiarities of Ice and Temperature Conditions in Deep Water Reservoirs

water to remain near the bottom in a stationary shelf, on top of which the colder water moved with little mixing effect. In addition, the density of water with temperatures between 4-5 ^{o} C differs less than by 1:100,000 parts, a fact slowing down interchange and explaining bottom temperatures higher than + 4 ^{o} C. A slow, but continuous temperature increase was observed at bottom levels during the winter. The temperature of water which left the upper head was generally higher when the intake was near the base of the dam. However, the depth of the intake had little influence on temperature values in reservoirs with high capacity intakes, where the entire active profile was involved in the interchange process. Ice conditions at the tailrace changed after the power plant had started to operate. No sludge entered the lower head, and freezing of water was retarded by water above 0 ^{o} C leaving the reservoir. The flow of ice on the reservoir started 2 weeks later than under natural conditions, and no ice was thrown over the dam. The area adjacent to the dam was covered with an ice sheet with temperatures of -20 to -30 ^{o} C. The preparation of new thermic calculations for deep reservoirs with flowing (circulating) water

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is required, because the existing data are based on shallow reservoirs, with a single layer of liquid, confined between the ice and the bottom.
The article contains 2 figures, 1 table and 1 Russian reference.

AVAILABLE: Library of Congress

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Sokol'nikov, N.M.

3(4,7) [illegible]

Vsesoyuznoye gidrologicheskiy s"yezd, [illegible], 1957.

Trudy...t. III: [illegible] (Transactions of [illegible] All-Union Hydrological Conference. v. 3: [illegible]) Leningrad, Gidrometeoizdat, 1959. 470 p. Errata slip [illegible]. 2,000 copies printed.

Sponsoring agency: Glavnoye upravleniye gidrometeorologicheskoy sluzhby pri Sovete Ministrov SSSR.

Resp. Ed.: V.A. Uryvayev; Ed.: V.S. Protopopov; Tech. Ed.: M.I. Braynina.

PURPOSE: This work is intended for meteorologists, hydrologists, and hydrophysicists, particularly those engaged in the study of snow and ice and evaporation processes.

COVERAGE: This book contains papers on hydrophysics which were presented and discussed at the Third All-Union Hydrological Conference in Leningrad, October 1957. The Conference published 10 volumes on various aspects of hydrology of which this is number 3. The editorial board in charge of the series include: V.A. Uryvayev (Chairman), O.A. Alekin, Ye.V. Bliznyak (deceased), O.N. Borsuk, M.A. Velikanov, L.K. Davydov, A.P. Domanitskiy, G.P. Kalinin, S.N. Kritskiy, B.I. Kudelin, L.P. Manoim, M.F. Menkel', B.P. Orlov, I. V. Popov, A.K. Proskuryakov, D.L. Sokolovskiy, O.A. Spengler, A.I. Chebotarev, and S.K. Cherkavskiy. This volume is divided into 2 sections: the first contains reports from the subsection for the study of evaporation processes, and the second contains reports from the snow and ice subsection. References accompany each article.

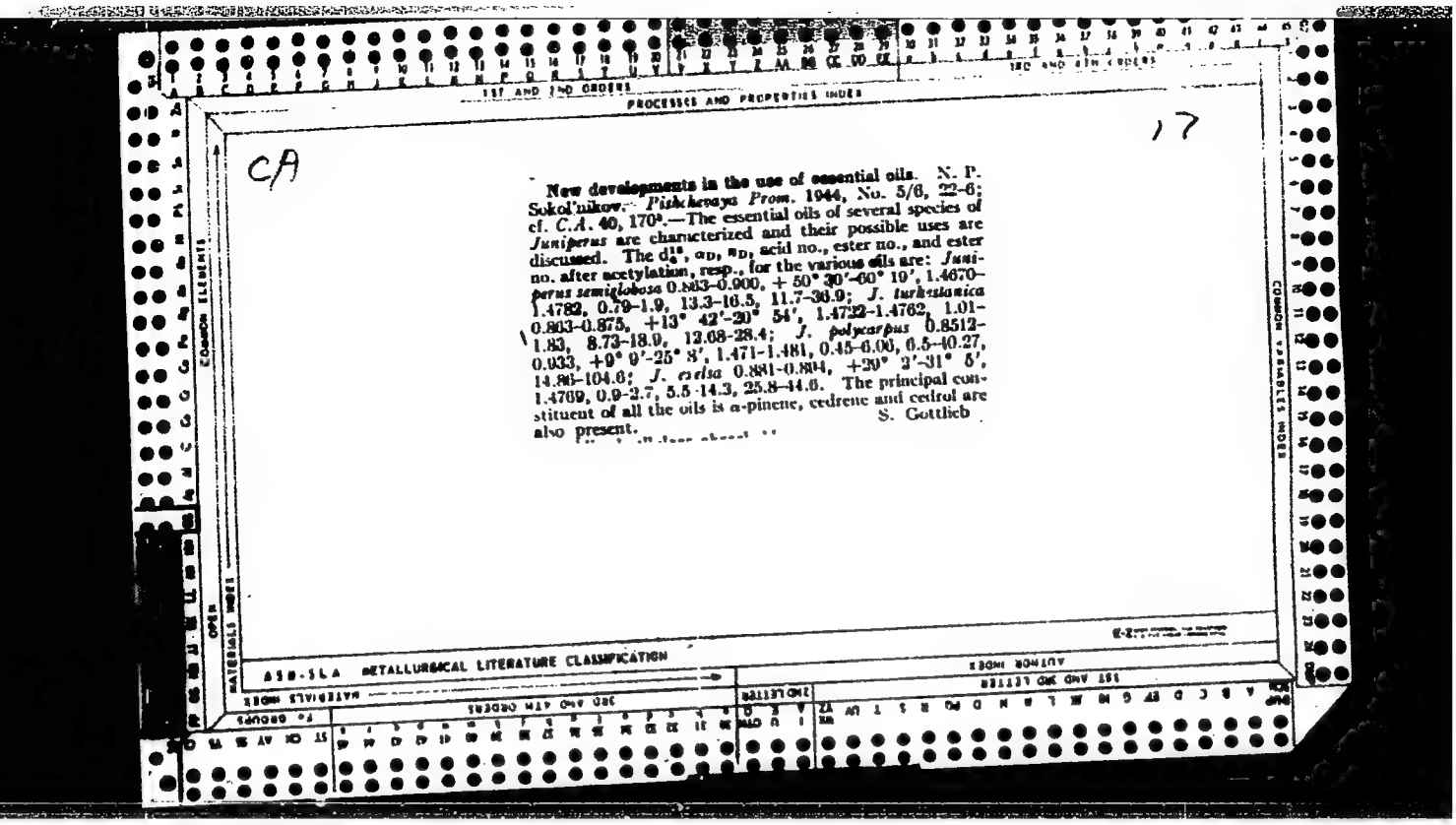
SOKOLNIKOV, N. O.

A. P. Kondr.tskiy and N. O. Sokolnikov, Posobiye dlya laborantov efiro-maslichnoy promyshlennosti [Manual for Laboratory Workers in the Essential-Oil Industr], Pishchepromizdat, 10 sheets

Gives the general concepts of essential oils and their use in the national economy. Describes the methods of processing the raw materials for essential oil, the control of production and the questions of the quality of the finished product. A table is annexed showing the technological indexes in processing essential-oil raw-material.

The book is a manual for laboratory workers in the essential-oil industry.

SO: U-6472, 12 Nov 1954



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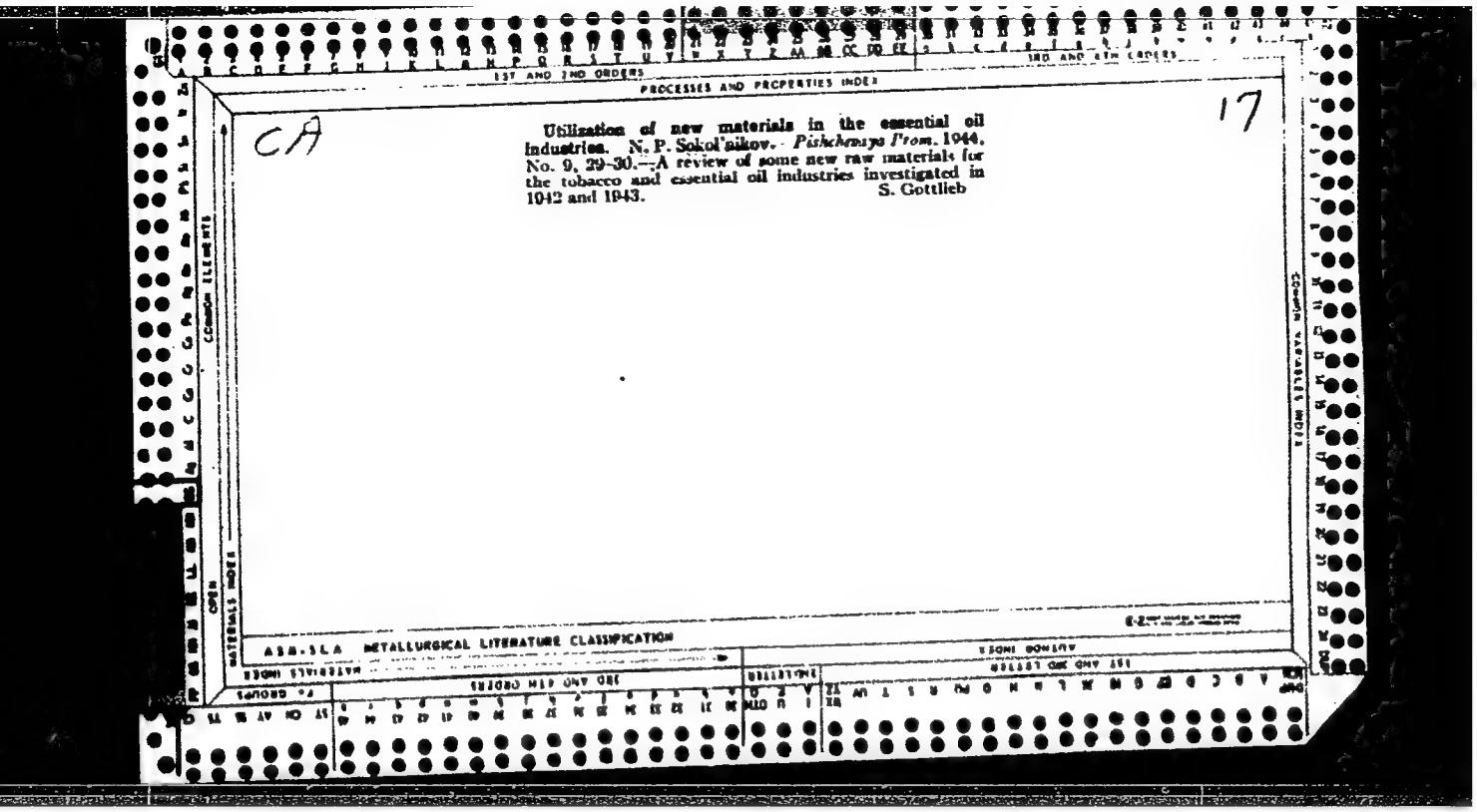
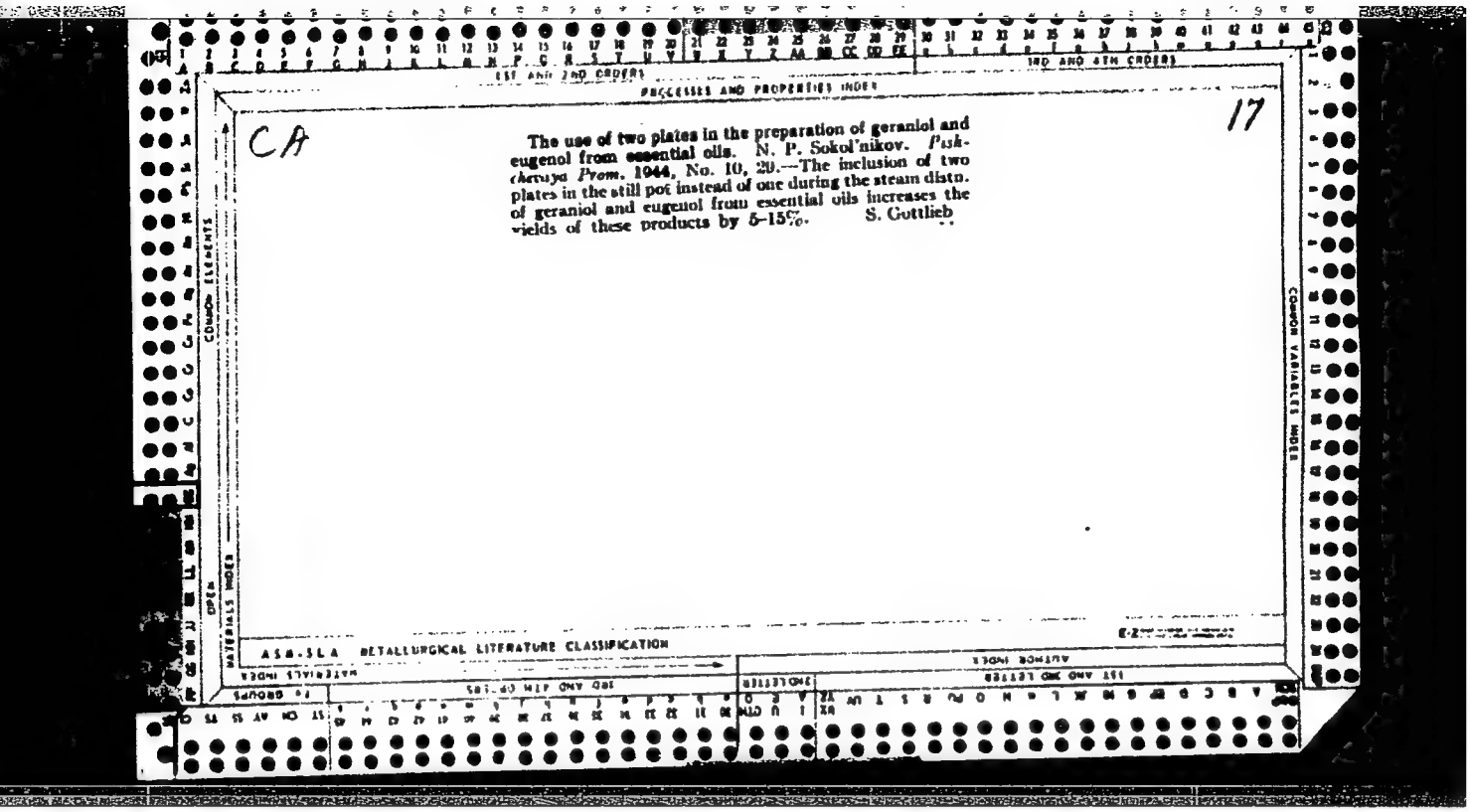
New developments in the use of essential oils. N. P. Sokol'nikov. *Pishchevaya Prom.* 1944, No. 5/6, 22–6; cf. *C.A.* 40, 170⁹.—The essential oils of several species of *Juniperus* are characterized and their possible uses are discussed. The d_4^{15}, α_D, n_D, acid no., ester no., and ester no. after acetylation, resp., for the various oils are: *Juniperus semiglobosa* 0.863–0.900, + 50° 30'–60° 19', 1.4670–1.4782, 0.79–1.9, 13.3–16.5, 11.7–36.9; *J. turkestanica* 0.863–0.875, +13° 42'–20° 54', 1.4722–1.4762, 1.01–1.83, 8.73–18.9, 12.08–28.4; *J. polycarpus* 0.8512–0.933, +9° 9'–25° 8', 1.471–1.481, 0.45–6.00, 6.5–40.27, 14.86–104.6; *J. excelsa* 0.881–0.894, +20° 2'–31° 5', 1.4769, 0.9–2.7, 5.5–14.3, 25.8–44.6. The principal constituent of all the oils is α-pinene, cedrene and cedrol are also present.

S. Gottlieb





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17

The use of two plates in the preparation of geraniol and eugenol from essential oils. N. P. Sokol'nikov. *Pishchevaya Prom.* 1944, No. 10, 29.—The inclusion of two plates in the still pot instead of one during the steam distn. of geraniol and eugenol from essential oils increases the yields of these products by 5–15%. S. Gottlieb

KONDRATSKIY, A.P.; SOKOL'NIKOV, N.P.; SKVORTSOVA, N.I., kandidat khimicheskikh nauk, redaktor.

[Manual for laboratory workers in essential-oil enterprises] Rukovodstvo dlia laborantov efiromaslichnykh predpriiatii. Moskva, Pishchepromizdat, 1953. 126 p. (MLRA 7:3)
(Essences and essential oils)

SOKOL'NIKOV, N.P., inzhener.

Continuous apparatus for processing essential oil from coriander. Masl.-zhir. prom. 18 no.9:18-20 S '53. (MLRA 6:9)

1. Glavparfyumer. (Essences and essential oils) (Coriander)

SOKOL'NIKOV, N.P., inzhener.

Processing mint in the continuous apparatus developed by A.N.Revazov and S.A.Moskalev. Masl.-zhir.prom. 19 no.7:21-22 '54. (MLRA 8:1)

1. Glavparfyumer.
(Mint oil) (Extraction apparatus)

USSR.

Experiments on extraction of azalea flowers. N. P. Sokol'nikov. *Maslobolno-Zhirovaya Prom.* 20, No. 2, 27–9 (1955).—Extn. of oil from *Azalea pontica* with petr. ether (b. 35–70°) has shown that the extn. of oil at the beginning of blossom formation is vital, that both flower buds and open flowers should be extd., and that it is necessary to harvest the blossoms in dry weather and process them the same day. They should be extd. twice in succession for 30–50 and 20 min., resp. Vladimir N. Krukovsky

SOKOL'NIKOV, N.P., inzhener.

Use of equipment treated with bakelite in the production of essential and extracted oils. Masl.-zhir.prom. 21 no.5:30-31 '56. (MLRA 9:10)

1.Glavparfyumer.
(Oil industries--Equipment and supplies) (Bakelite)

SOKOL'NIKOV, N.P., inzhener.

Mechanical fermentation of the rose blossoms and petals. Masl-zhir. prom. 23 no.3:38-39 '57. (MLRA 10:4)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut sinteticheskikh i natural'nykh dushistykh veshchestv.
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SOKOL'NIKOV, M.P., inzhener; KASHNIKOV, V.V., inzhener.

Continuous cohobator. Masl.-zhir.prom. 23 no.6:41-44 '57.
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(Eugenol) (Distillation apparatus)

SOKOL'NIKOV, N.P., inzh.; KONDRATSKIY, A.P., prof. [deceased]; VOYTKEVICH, S.A., kand.khim.nauk, retsenzent; SKVORTSOVA, N.I., kand.khim. nauk, spetsred.; KALMENS, R.I., red.; DOBUZHINSKAYA, L.V., tekhn.red.

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SOKOL'NIKOV, N.P., inzh.

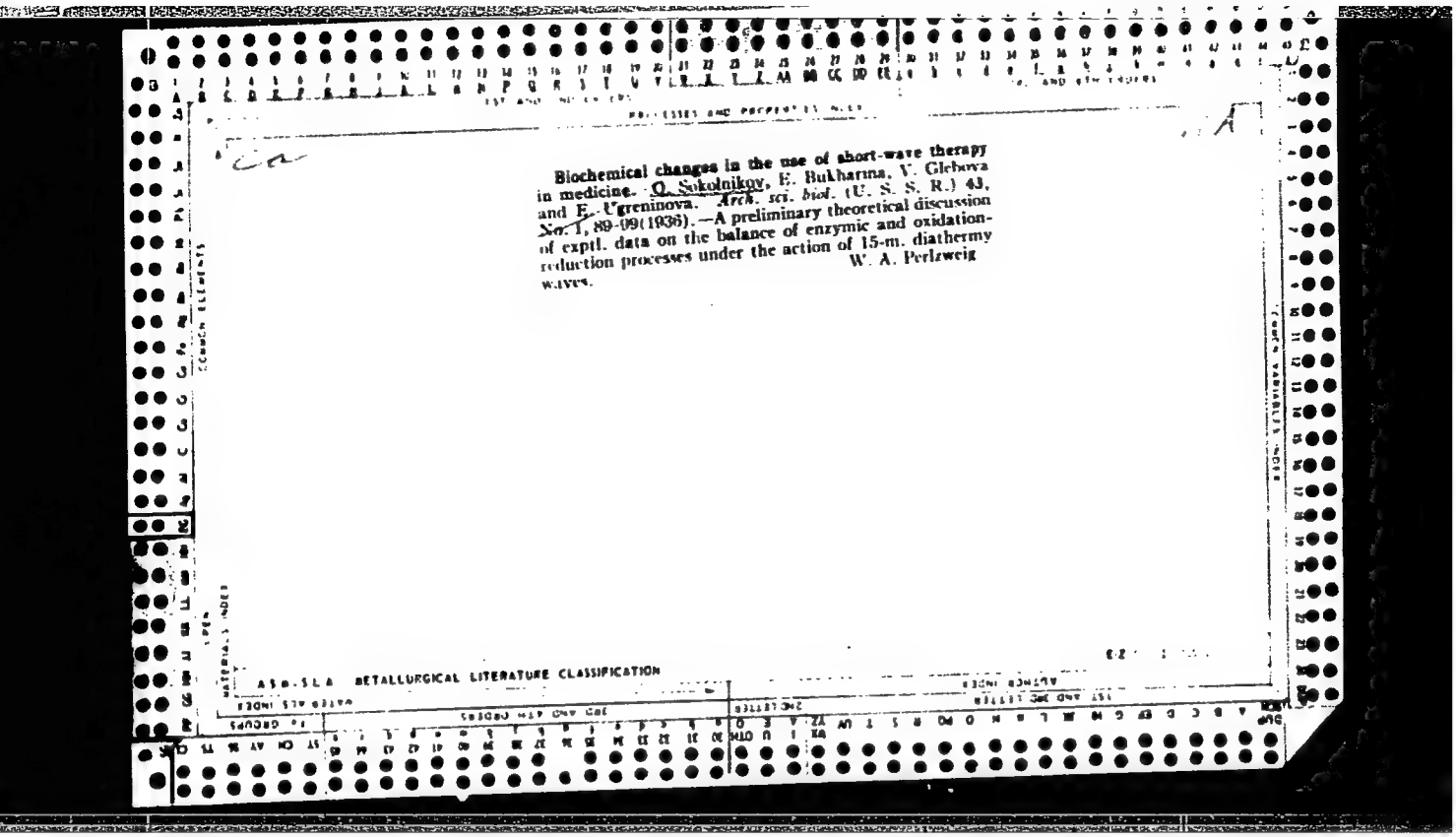
Tishchenko fractionation apparatus. Masl.-zhir. prom. 24 no.3:40 '58. (MIRA 11:4)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut sinteticheskikh i natural'nykh dushistykh veshchestv.
(Peppermint oil) (Distillation apparatus)

SOKOL'NIKOV, N.P., inzh.

Mechanized sections for the preservation of rose petals. Masl.-zhir.prom. 25 no.2:41-42 '59. (MIRA 12:2)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut sinteticheskikh i natural'nykh dushistykh veshchestv.
(Roses--Storage)



Biochemical changes in the use of short-wave therapy in medicine. O. Sokolnikov, E. Bukharina, V. Glebova and E. Ugreninova. *Arch. sci. biol.* (U. S. S. R.) 43, No. 1, 89-99(1936).—A preliminary theoretical discussion of exptl. data on the balance of enzymic and oxidation-reduction processes under the action of 15-m. diathermy waves.

W. A. Perlzweig

A 5 8-5 L A METALLURGICAL LITERATURE CLASSIFICATION

SOKOL'NIKOV, O. I.

PA76T66

USSR/Medicine - Blood Pressure, High May 1948
Medicine - Balneology and Balneotherapy

"Balneotherapy of Hypertonic Disease," O. I. Sokol'nikov, Prof B. A. Gintsberg, Ye. I. Ugreninova, Cen. Inst of Health Resorts, 2 pp

"Sov Meditsina" No 5

Balneotherapy is one of active methods of curing hypertonic disease, being indicated in every stage except final one. Describes effects of carbonate and radioactive baths.

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2. USSR (600)
4. Blood - Circulation
7. Adrenalin, arterenol and their role in the physiology and pathology of blood circulation. Vop. pat. serd.-sos. sist. no. 1. 1952.

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USSR

Proteoses and their importance in the pathogenesis and clinical treatment of hypertensive disease. O. I. Sokol'nikov and I. K. Grabenko. *Trudy Inst. Klin. i Eksptl. Kardiologii, Akad. Nauk Gruzin. S.S.R.* 2, 479–87(1953); *Referat. Zhur., Khim.* 1954, No. 32730.—Blood from patients suffering from hypertensive disease (HD) was analyzed for the products of protein metabolism. The arteriovenous difference in the amt. of the so-called proteoses (primary products of the protein degradation) was used as an index of the intensity of the muscular atrophy. Normally, the amt. of proteoses is higher in the arterial than in the venous blood; during HD this difference disappeared. The threshold of the pptn. of blood proteins by 1% $Fe(OH)_3$ soln. was lowered during the disease. The activities of cytochrome oxidase and of succinic dehydrogenase also were detd. in several tissues. Conclusion: During HD the oxidative processes are decreased while those of hydrolytic character are increased in the tissues. E. Wierbicki

FOGEL'SON, L.I., prof., red.; SOKOL'NIKOV, O.I., red.; GRITCHENKO, N.V., red.; BEL'CHIKOVA, Yu.S., tekhn.red.

[Disability evaluation in internal diseases] Vrachebno-trudovaia ekspertiza pri vnutrennikh bolezniakh. Moskva, Gos.izd-vo med. lit-ry, 1960. 349 p. (MIRA 13:11)
(DISABILITY EVALUATION) (MEDICINE, INTERNAL)

SOKOL'NIKOV, O.I., prof.

Young science of old age. Zdorov'e 7 no.11:10-11 N '61. (MIRA 14:11)

(OLD AGE)

SOKOL'NIKOV, O.I., doktor med. nauk, prof.

"Therapeutic physical culture in a clinic for internal disease" by V.N.Moshkov. Reviewed by O.I.Sokol'nikov. Vop.kur.,fizioter. i lech. fiz. kul't. 28 no.2:178-179 Mr-Ap'63. (MIRA 16:9)
(PHYSICAL THERAPY) (MEDICINE, INTERNAL)
(MOSHKOV, V.N.)

SOKOL'NIKOV, O.I.; ARBATSKAYA, Yu.D.; DUKHOVNAYA, O.L.

Prophylactic significance of rational rehabilitation in sluggish and latent rheumatic fever. Vop.revm. 2 no.3:65-69 Jl-S '62. (MIRA 16:2)

1. Iz kafedry vrachebno-trudovoy ekspertizy (zav. - prof. I.I. Sokol'nikov) TSentral'nogo instituta usovershenstvovaniya vrachey (rektor M.D. Kovrigina), Moskva.
(RHEUMATIC FEVER) (OCCUPATIONAL THERAPY)

SOKOLNIKOV, (O M)

Among the titles and authors of papers and other expected participants at the 15th International Congress of Limnology in Madison, Wisconsin, 20-25 Aug 62, are the following:

USSR

GAYEVSKAYA, N. S., Kaliningrad College of Fishery, Kaliningrad - "The role of high aquatic plants in trophic cycles of fresh water bodies"

GORBUNOV, K. V., Astrakhan State Reservation, Astrakhan - "The role of cellulose bacteria in biological productivity of water bodies"

IVLEV, V. S., Sevastopol Biological Station ioeni A. O. Kovalevsky, Sevastopol - "The transformation of energy on the highest trophic levels of a production process" and "Energetics of fish production" [Review Paper, Session I]

KORDE Nina Vital'yevna, Laboratory of Forestry, Academy of Sciences USSR - "The trophic of water bodies on different stages of their historical development"

KROGIUS, F. V., Kamchatka Department, Pacific Institute of Marine Fishery and Oceanography - "On the connection of flowing down of young fish of red salmon with the condition in a lake"

KROKHIN, Yevgeniy Mikhaylovich, Kamchatka Department, Pacific Institute of Marine Fishery and Oceanography - "The influence of a dimension of admission of red salmon producers on the phosphate regime of spawning lakes"

KUZNETSOV, Sergey Ivanovich, Institute of Micro-Biology, Academy of Sciences USSR - "The role of microorganisms in the destruction of organic substances in a water body" and, "Decomposition-Processes, results and limnological significance, microbiological" [Plenary Session IV]

MESHKOVA, Tat'yana, Dr., Hydrobiology Station, Seran, Armenian SSR - [has accepted invitation but has not submitted paper]

PANKRATOVA, V. Ya., Zoological Institute, Academy of Sciences USSR - "On the evolution of tendipedids larvae (Chironomidae) in connection with the conditions of existence"

RASPOPOV, I. M., Laboratory of Limnology, Academy of Sciences USSR - "On the main concepts and directions of hydrobotany in the Soviet Union"

RODINA, A. G., Zoological Institute, Academy of Sciences USSR - "Microbiology of the detritus of lakes"

ROSSOLIMO, L. L., Institute of Geography, Academy of Sciences USSR, and GLAZIY, Grigoriy I., Siberian Department of the Academy of Sciences USSR - "The Lake Baykal"

SMIRNOV, Nikolay Nikolayevich, Institute of Biology of Water Reservoirs, Academy of Sciences USSR - "Ecology of the phytophylic Phyllopoda in connection with the estimation of the role of the littoral zone of the life of Volga water reservoirs"

SOKOLNIKOV, O. M., Limnological Institute, Siberian Department of the Academy of Sciences USSR - "The ice regime of the Baykal Lake"

STROGANOV, N. S., Biological Faculty, Moscow University, Moscow - "Influences of small concentrations of poisonous matter on hydro-organisms", and "On the question of the influence of sewage on waters"

VOTINTSEV, K. K., Limnological Institute, Siberian Department, Academy of Sciences USSR - "Turn-over of the organic matter and some biogenic elements in the Baykal Lake"

YANKOVSKAYA, Aleksandra Ivanova, Zoological Institute, Academy of Sciences USSR - "The fauna of high mountain water bodies of Middle Asia"

ZHADIN, V. I., Zoological Institute, Academy of Sciences USSR - "Migration of the radioactive phosphorus at fertilizing a water body"

ZHURAVEL, P. A., Dnepropetrovsk Scientific Institute of Hydrobiology of the State University, Ukrainian SSR - "Acclimatisation of fishes' food organisms from the fauna of estuary complex (of the 'Caspian relict type') in water reservoirs of the Ukraine and the Crimea"

KHARTSIYEV, N.; SOKOL'NIKOV, V.

Practice in the mechanization of motor vehicle washing. Avt. transp. 38 no. 5:52 My '60. (MIRA 14:2)
(Motor vehicles—Maintenance and repair)

SOKOL'NIKOV, V.I., master

We are mechanizing labor-consuming processes. Elek. i tepl.tiaga 2 no.4:27-28 Ap '58. (MIRA 12:3)

1. Instrumental'nyy tsekh depo Dema, Ufimskaya doroga.
(Electric locomotives--Maintenance and repair)

SOKOL'NIKOV, V.M., kandidat tekhnicheskikh nauk

Formation of ice in Baikal during the spring-summer period. Priroda 44 no.9:116 S '55. (MLRA 8:11)

1. Baykal'skaya limnologicheskaya stantsiya Akademii nauk SSSR
(Baikal, Lake--Ice)

SOKOL'NIKOV, V.M.

Some features in the formation and growth of the ice cover. Trudy Baik. limnol. sta. 15:58-64 '57. (MLRA 10:8)
(Ice on rivers, lakes, etc.)